



ON THE GEOLOGY

OF

THE OTTAWA AND PARRY SOUND RAILWAY.

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THE GEOLOGY OF THE OTTAWA AND PARRY SOUND RAILWAY.

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The opening of the Ottawa, Arnprior and Parry Sound railway, while marking an epoch in the affairs of the Capital from the commercial standpoint, furnishes, to the student of Natural History, fresh fields for study along the several lines in which the members of the Field-Naturalists' Club are interested. It has rendered readily accessible many places which have hitherto been reached with great difficulty and at very considerable expense. To the student of Geology and Palæontology it is especially advantageous; since many interesting points can now be easily reached and large areas of fossiliferous strata can be examined, many of which will furnish a rich harvest to the collector. With the object of calling attention to some of these, and thus arousing interest in the subject on the part of our younger members, as well as renewed interest among those who have already done good work in collecting and determining the fossil contents of our Palæozoic formations, a brief sketch of some of the leading geological features observable along the line is here presented.

Starting from the Capital, a short run of about fifteen miles over a generally level country brings us to the first stopping place near the line between Nepean and March. The formations traversed in this distance are nearly all horizontal, and comprise the Trenton, Black River, Chazy, Calciferous and Potsdam. The last three can be well seen between the crossing of the Canadian Pacific railway, south of Britannia, and the station

at South March. The Black River and the Trenton formations, between this crossing and the city are well exposed, and contain well defined characteristic fossils which are obtainable from the ledges on the Experimental Farm and on the knolls to the west. An interesting feature to be noticed as we approach the March line is a cutting in which Potsdam sandstone is penetrated by dykes of quartzose granite which have altered the rocks in contact very considerably. The sandstone in the vicinity contains numerous markings of *Scolithus*, and the quarry, from which the stone was obtained of which much of the Parliament buildings is composed, is situated on the hill near by. This locality is therefore of very considerable interest in several ways and affords excellent opportunities for the study of our lowest Palæozoic formation in the Ottawa basin. As we approach South March station, however, knolls of hard dioritic and granitic rock appear on either hand, and form the eastern terminus of a somewhat extensive ridge of the old Laurentian rocks. These embrace granite, gneiss, crystalline limestone, etc. and in close proximity to the station are deposits of mica and graphite which form interesting subjects of study to the mineralogist. A number of minerals can be collected at this place and the locality is well worthy of a visit by the club at some not far distant day.

From March to Carp the road traverses a depression in these Laurentian rocks, coming out on the Palæozoic basin about two miles east of the latter station. The old rocks, however, continue along the north side of the railway below this place and present excellent opportunities for the study of the various eruptives which are associated with the Laurentian everywhere throughout this area. At Carp station, several cuttings in the gravels contain shells of marine origin, and the study of the sands and gravels allied to the glacial period can be readily made. The Black River limestone can be well seen two or three miles to the south of the station and these hold an abundance of the characteristic fossils of the formation which are easily obtainable.

From Carp to Kinburn, which is the next station, going west, the country is clay covered and rock ledges do not appear; but the Black River limestones continue to the south, and about two miles east of Kinburn, on the road north of the railway, a large quarry in this rock affords excellent opportunities for collecting the characteristic fossils of the formation. South of Kinburn station a drive of six miles over a good road brings one to Pakenham, where the Black River formation is also well exposed on the Mississippi River, and where fossils can be obtained in the bed of the stream at low water in great abundance. This is an excellent locality for their study and very convenient of access. Thence towards Galetta, the road, after following the valley of the Carp River for a mile or so, enters the low ridge of the Laurentian again and furnishes a good opportunity for observing the relations of the granites, gneisses and associated limestones till Galetta is reached. These rocks can also be well seen at this latter place and the intrusive dykes are easily recognized. About a mile and a half from the station on the road to Fitzroy Harbor, and a short distance north of the channel of the Mississippi, an old opening in limestone for a lead mine is an interesting point for mineralogical study, the association of the eruptive dykes being well seen at this place.

At Fitzroy Harbor, four miles from Galetta, are the celebrated Chats Falls, probably the most beautiful in the whole course of the Ottawa River. The water falls in a series of cascades over a huge dyke of granite extending across the entire channel of the river which here has a breadth of two miles or more, thus furnishing a magnificent water power, destined at no distant day to be utilized, and equal in economic importance to that of the Chaudiere in this city. This locality is a very interesting one to the geologist since the crystalline limestones are here largely developed and there is also a great variety of intrusives associated with them.

The crystalline limestones extend to Arnprior, which is situated at the junction of the Madawaska and the Ottawa

Rivers ; but at this place they are overlaid by horizontal beds of the Calciferous limestone which show at several points in the town and along the river up to Braeside to the south of which, however, the fossiliferous ledges of the Black River formation are seen and are well worthy of study, several quarries being located in its strata. A little farther west, to the south of Sand Point, excellent opportunities are also presented for collecting the characteristic fossils of the formation, the beds holding *Tetradium fibratum* being well developed about a mile south of the last named place.

The bluish-striped limestones of Arnprior, and of the section thence to Renfrew, belong to what has been called the Hastings Series ; and by crossing the Ottawa River by the ferry from Braeside, their continuation into the province of Quebec can be readily seen, the association of striped crystalline limestone, hornblende rocks and dolomitic and other schists being well exhibited, so that this locality is a very interesting one from the geological standpoint. The celebrated Iron mines of Bristol are situated in the rocks of this series on the Quebec side of the Ottawa.

Between Arnprior and Glasgow, the next station, the road traverses an area, largely clay covered, but ridges of the peculiar bluish-striped crystalline limestone, which is extensively quarried at Arnprior, occur at intervals. At Glasgow, however, these are cut off by a well pronounced area of reddish granite which crosses the track and extends northward for several miles. In its westward extension this granitic belt has a breadth of several miles on the Renfrew and Burnstown road and is an important geological feature in this area. From Glasgow to Renfrew, the rocks, where exposed, are alternately granites and crystalline limestone, the latter predominating as Renfrew is approached. At this latter place extensive quarries are in operation in the limestone and large quantities are extracted, both for building and for burning to lime, for both of which purposes it is well suited.

West of Renfrew an extensive clay flat extends up the

valley of the Bonnechère River to the vicinity of Douglas. To the north of this valley the rocks are crystalline of the old series, comprising both limestones and gneisses as well as frequent masses of granite. Similar rocks occur to the south of the railway, but approaching Douglas it skirts the south side of a large outlier of the Black River formation and several quarries are here located in these rocks. In these the characteristic fossils are quite abundant and a careful study of the several strata will amply repay the collector. To the north of Douglas village also these rocks are well exposed, and will yield good results.

From Douglas to Caldwell the rocks are of the old series, being well exposed near the latter station. Occasionally pyroxenic rocks are seen with these, and traces of various minerals were observed at several points, but not in quantity to be of economic importance. But little exploration has yet been done in this area for minerals as yet, and it is possible that subsequent search may be more successful. The road passes about a mile to the south of Eganville which is on the Bonnechère River; but before reaching Eganville station it crosses another very considerable outlier of the Black River formation, which extends northward to the river and also presents a good field to the fossil collector. At Eganville itself the Chazy also appears, and the presence of several small faults along the valley of the stream tends to complicate the structure and make the study more interesting. To the south of Eganville, at Clear Lake, a very interesting mineralogical field is presented, and several islands in this lake have afforded a rich collecting ground for mineralogists both from the United States and Canada for some years, and some very rare and valuable minerals have been obtained. A very interesting outlier of Utica Shale was found several years ago by the officers of the Geological Survey on the north slope of the mountain which rises from the south shore of the lake, at an elevation of about 800 feet above the sea.

The valley of the Bonnechère west of Renfrew, and nearly to Douglas, is occupied by heavy deposits of clay. These must

in places have a depth of nearly a hundred feet ; but though undoubtedly of marine origin, they have as yet, in this particular locality yielded no marine organisms. This is however a feature observed in most of the clays of the upper Ottawa basin, the marine shells being almost entirely confined to the overlying sands and gravels. The same mode of occurrence is observed near the St. Lawrence at River Beaudette, where a ridge of gravel, in places very coarse in character, has yielded the valves of a large *Balanus* as well as other marine forms. Characteristic Chazy rocks, however appear in the stream at Douglas Village, underlying the Black River formation and extend up the valley of the Bonnechère for some distance. They are also well exposed at the Fourth Chute about midway between Douglas and Eganville, and at this place there is "remarkable subterranean channel, where a part of the water turns off at right angles to the general course, running northerly, for about ten chains, through a great cavern. This cavern is usually nearly dry, excepting during freshets, but has been turned to advantage by throwing a dam across the main body of the river near the middle of the fall. This turns through a sufficient quantity of water to convert the channel into a mill-race, and the fall at the lower end is applied to drive the wheel of the mill.*" The Black River limestones are also well exposed on the north side of the river to the west of Douglas and contain characteristic fossils of the formation.

Going west from Eganville we traverse considerable areas of drift, the underlying rocks being the gneisses and limestones of the Laurentian, till we reach Golden Lake station. This is situated near the lower end of Golden Lake, a beautiful sheet of water about eight miles in length, around the shores of which the crystalline rocks are well exposed, and these occupy the country to Killaloe near the upper end of the lake. Here the gneisses are in great force and well stratified. The cuttings along the road between Golden Lake station and this point are

*Geology of Canada, p. 176, 1863.

largely in drift gravel and sand, which has replaced the clays which form so prominent a feature to the eastward. These sands have a wide distribution in all directions and the distribution of the drift in this vicinity forms an interesting subject of study. Great blocks of the Black River limestone occur here and there, and a very interesting development in this connection is the number of them observed on the high ridge to the south of Clear Lake at an elevation of nearly 1400 feet above the sea, along the Brudenell road.

The country west of Golden Lake now becomes much more rugged, the surface being hilly and the valleys occupied largely with drift sand and gravel. Thence on to Barry's Bay the rocks are mostly granitic and gneissoid, the limestones having but a small development; but a small outlier of Palæozoic rocks was noted in a shallow cutting on the road about four miles west of Killaloe station, which appeared to belong to the Chazy limestone formation, but from which no fossils were obtained, and its exact horizon is therefore as yet undetermined. The granitic character extends westward from Barry's Bay for a long distance but the geology of the western portion of this road has not yet been examined.

Many interesting observations on the striæ have been made and the general course of the ice movements have been approximately outlined. These will however form the materials for another paper by Mr. Wilson on the surface geology of the area which will be of much interest and value.

In addition to the locality at Carp where marine shells can be obtained it may be of interest to note that these fossils were also observed on the summit of the Laurentian ridge north of Kinburn, and easily accessible by the road leading directly north-east from that station, at about three miles distant. Another interesting locality, for these shells, readily reached from Glasgow station by the road leading north from that point, is the summit of the ridge to the south of Sand Point, which also is a station on the Canadian Pacific railway. The shells at this place are strewn over the surface of the Black River or lower Trenton

limestone which forms a ridge rising to the height of about a hundred feet above the Ottawa River at this place. The sand or gravel in which the shells were originally embedded has nearly all been removed and the bare rock is exposed at the surface. This is also an excellent spot for collecting fossils from the underlying rocks.

For those members of our Club who are interested in fossil collecting an excellent opportunity is afforded for the study of the fauna of the Black River formation in the many scattered outliers which are found to the south of the Ottawa River, in the townships of Bromley, Stafford and Wilberforce. Those between Douglas and Cobden can be easily reached, either by the Ottawa and Parry Sound railway, from Douglas station, or from Cobden on the Canadian Pacific. Large outliers occur in Stafford near the lower end of Muskrat Lake in which the fossils are abundant and easily obtained. The celebrated locality at the Paquette's Rapids on the Ottawa, near the foot of Allumette Island, is now easily reached by the Pontiac and Pacific Junction railway, which now runs to that point, but a week's trip or even less will enable one to visit all the principal areas to the south of the river and furnish plenty of material for future study. The Black River formation at one time must have had a very extensive development, since its scattered outliers are now found over a very considerable extent of country, lying between the Ottawa and the Madawaska Rivers. Among the most extensive, and at the same time most readily accessible of these, is a series of outcrops to the south of Arnprior, lying to the north of the mountain ridge which extends from the vicinity of White Lake to Pakenham. These have as yet been but little studied, but the rocks contain an abundance of fossils at many points and some of the principal exposures can be reached in a distance of four to five miles south from either Arnprior or Galetta.

For convenience of reference a synopsis of the various geological formations to be seen at the several stations is appended. The elevations of the different points along the line

have been kindly furnished by Mr. James White, Geographer to the Geological Survey.

STATIONS.	ELEVATION ABOVE SEA LEVEL.	REMARKS.
Ottawa, Central Station.	218 ft.	Trenton and Utica, well exposed.
Elgin St. Sta.	226	
South March	292	Potsdam sandstone and Laurentian gneiss and limestone with diorite and granite. Mica and graphite in the vicinity.
Carp.	315	Clays and gravels; the latter with marine shells, underlaid by Black River limestone. Laurentian gneiss and granite in ridge to the north.
Kinburn.	319	Clay flat, underlaid by the Black River formation. Laurentian granite and gneiss with crystalline limestone in ridge to the north. Marine shells on summit of ridge three miles to the north.
Galetta.	402	Mostly crystalline limestone of the old series with some gneiss, cut by dykes of granite. Marine shells near Mohr's Corner about a mile to the south-east.
Arnprior.	309	Bluish striped crystalline limestone of the Hastings series, overlaid by Calciferous limestone. Black River outcrops to the south.
Glasgow.	350	Ridge of black hornblende-rocks and reddish granite which cuts the striped limestone of the vicinity, Hastings series. Marine shells on Sand Point ridge, three miles to the north-east.
Goshen.	392	Striped crystalline limestone.
Renfrew.	410	Striped crystalline limestone of the Hastings series, with ridges of hornblende schist and masses of reddish granite. Important quarries in the limestone.
Admaston.	423	Clay flat of the Bonnechère.
Douglas.	455	Large outliers of the Black River limestone with crystalline limestone and gneiss underlying.
Caldwell.	505	Mostly reddish granitic gneiss; some pyroxenic rocks in the vicinity. The 4th chute of the Bonnechère to the north.
Eganville.	528	Drift with large outliers of the Black River formation in the vicinity. Chazy and Black River rocks on the Bonnechère at the village.
Golden Lake.	543	Crystalline limestones and gneisses with granite.
Killaloe.	663	Reddish and hornblende gneiss, well stratified.
Barry's Bay.	937	Gneiss and granite. Much of the country occupied by drift sand and gravel.

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